The Physics of Metals and Metallography

ФИЗИКА МЕТАЛЛОВ и МЕТАЛЛОВЕДЕНИЕ

VOL. 51 1981

Published May 1982

THE PHYSICS OF METALS AND METALLOGRAPHY
FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 1, 1981

Chief Editor:
S. V. Vonsovskii

Deputy Chief Editor:
V. I. Arkharov

EDITORIAL BOARD:

V. I. Arkharov, A. N. Orlov, S. V. Vonsovskii, V. A. Pavlov, V. D. Kuznetsov, V. D. Sadovskii, G. V. Kurdyumov, R. I. Ianus, B. G. Lazarev, Ya. S. Shur, A. G. Lesnik

Translation Editor:
Professor J. Christian

Translator:
V. Alford

The Physics of Metals and Metallography is a cover-to-cover translation of *Fizika metallov i metallovedenie* and is published monthly by Pergamon Press in collaboration with the Board of Gevernors of Acta Metallurgica.

Issued monthly. Two volumes per annum consisting of six issues each and containing approximately 200 pages per issue.

Publishing and Advertising Offices

Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, England
Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523, U.S.A.

Annual Subscriptions (1982) are:

To Libraries, Research Establishments, all other multiple-reader institutions and individuals, $500.00 *including postage and insurance. Two year subscription rate (1982/1983):* $950.00.

To members of co-operating and sponsoring societies of Acta Metallurgica, $25.00 *including postage.*

Subscriptions are only serviced after payment has been received, and are not accepted for less than one year.

Subscription enquiries from customers in North America should be sent to: Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford NY 10523, U.S.A. and for the remainder of the world to: Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 0BW, U.K.

Microform Subscriptions and Back Issues:

Back issues of all previously published volumes are available in the regular editions and on microfilm and microfiche. Current subscriptions are available on microfiche simultaneously with the paper edition and on microfilm on completion of the annual index.

Copyright © 1982 Pergamon Press Ltd.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic tape, mechanical, photocopying, recording or otherwise without permission in writing from the publishers.

U.S. Copyright Law Applicable to Users in the U.S.A.

The appearance of the code on the first page of an article in this journal indicates the copyright owner's consent that copies of the article may be made for personal or internal use or for the personal or internal use of specific clients. This consent is given on the condition, however, that for copying beyond that permitted by Sections 107 or 108 of the US Copyright Law, the copier pays the per-copy fee included in the code. The appropriate remittance should be forwarded with a copy of the first page of the article to the Copyright Clearance Center Inc., 21 Congress Street, Salem, MA 01970. This consent does not extend to other kinds of copying, such as copying for general distribution, for advertising or promotional purposes, for creating new collective works or for resale. Copies of articles published prior to 1978 may be made under similar conditions.

PUBLISHED BY

PERGAMON PRESS
OXFORD·NEW YORK·PARIS·FRANKFURT

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 1 — 1981

CONTENTS

V. G. Bar'yakhtar, Ye. V. Zarochentsev and S. M. Orel	1	Microscopic theory of the dependence of the properties of simple metals on changes in the Fermi surface topology
A. A. Smirnov	9	Theory of diffusion of interstitial atoms passing through different types of interstitial site with any degree of occupation
S. Yu. Davydov, A. P. Popov and V. I. Troyan	17	On the magnetic structure of an adsorbed layer
I. G. Kuleyev	21	The scattering of conduction electrons by magnetic impurities with abritrary spin in a quantizing magnetic field in the one-electron approximation
O. B. Sokolov and V. I. Grebennikov	34	Electron-hole correlations in soft X-ray emission spectra of metals. The coupled state
V. P. Kalashnikov, M. I. Auslender and N. G. Bebenin	41	Macroscopic equations of magnet dynamics. IV. *s–d* model far from equilibrium
V. A. Polukhin and M. M. Dzugutov	50	Statistical analysis of the structure geometry of the dynamic molecular model of amorphous and liquid hydrogen
V. M. Laptev and Yu. N. Skryabin	55	Phase diagrams of magnetic superconductors
L. V. Al'tshuler, A. I. Voropinov, G. M. Gandel'man, N. A. Dmitriyev and V. G. Podval'nyy	61	The structural peculiarities of the high-pressure electron spectra of rare metals
G. S. Kandaurova, V. O. Vas'kovskiy and M. F. Karimov	66	Magnetic properties and domain structure of heterogeneous amorphous films of GdCo
V. A. Zaykova and I. Ya. Eingorn	73	Quasistatic and dynamic magnetostriction curves of silicon iron crystals
M. Gottwald, V. Faja and M. Kŏsarž	77	Determination of the optimum concentration of carbide phase in a low-alloy niobium-containing heat-resistant steel
S. Z. Bokshteyn, Ye. V. Bolberova, S. T. Kishkin and I. M. Razumovskiy	84	Diffusion characteristics of the grain boundaries of eutectic alloys with an oriented structure
V. M. Koleshko and V. F. Belitskiy	89	Growth of crystal whiskers on the surface of thin aluminium foils
D. A. Mirzayev, V. G. Ul'yanov, M. M. Shteynberg and V. A. Protopopov	96	Structural and kinetic stages of the $\beta \rightarrow \alpha$ transformation in titanium
N. V. Ageyev, M. M. Kantor, M. S. Model', Ye. N. Samoylov and R. M. Sofronova	103	Influence of small additions of osmium and iridium on the decomposition of the solid solution in alloys of molybdenum with carbon
T. Ye. Antonova, I. T. Belash and Ye. G. Ponyatovskiy	110	Phase diagram of cerium under pressures up to 85 kbar
V. A. Toldin, A. A. Burykin and G. V. Kleshchev	116	Influence of magnesium additions on the phase sequence during ageing of AlZn alloys with a high zinc content
V. G. Gavrilyuk, D. S. Gertsriken, Yu. A. Polushkin and V. M. Fal'chenko	125	Mechanism of cementite decomposition during plastic deformation of steel

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN – DUAM)

V. V. Sobolev, N. A. Nesterov and P. M. Trefilov	130	Dynamics of mass transport in a dendritic cell during solidification of a binary alloy
Ye. A. Fokina, L. V. Smirnov, V. N. Olesov, V. M. Schastlivtsev and V. D. Sadovskiy	136	Morphological peculiarities of martensite formed under the influence of a magnetic field
V. P. Pugachevich, K. A. Morozov and A. V. Bezrukov	142	Investigation of the recrystallization processes of palladium in a field-ion microscope
Yu. I. Ustinovshchikov, A. Ye. Prozherin and I. M. Kovenskiy	148	Secondary hardening of molybdenum and vanadium steels
V. R. Baraz, S. V. Grachev, A. R. Koemets, D. P. Rodionov and L. V. Smirnov	155	Features of texture formation and stress relaxation in deformed single crystals of a heat-resistant austenitic steel
N. T. Travina, Ye. V. Ugarova, Ye. G. Sochilin and A. A. Nikitin	162	Work hardening of single crystals of $Ni_3(Al, Cr)$
O. A. Kaybyshev, V. V. Astanin, R. Z. Valiyev and V. G. Khayrullin	166	Investigation of grain boundary sliding in zinc bicrystals with a symmetrical tilt boundary
R. K. Aubakirova, V. A. Likhachev, M. M. Myshlayev, A. A. Presn'yakov and D. R. Chalayev	172	Creep of superplastic alloy Zn–22% Al in torsion
		Short Reports and Letters to the Editor
Yu. N. Koval' and A. I. Molin	182	The fine structure of the e.m.f. arising on explosive formation of martensite in alloy Fe–31% Ni
G. P. Bakach, L. A. Korniyenko and Ye. F. Dudarev	184	Stages in the development of the plastic deformation of f.c.c. solid solutions of copper in the polycrystalline state
M. P. Krulikovskaya and L. I. Chirko	187	Influence of gold on the variation of the disordering point of alloy Cu–Zn–Au under γ irradiation
V. V. Nemoshkalenko, I. G. Zakharchenko, V. S. Kshnyakin, L. I. Nikolayev, S. V. Bubnov and O. Kh. Tadeush	189	L_α spectra of deformed titanium
O. A. Troitskiy and V. I. Stashenko	191	Determination of the mechanical stresses induced by current
T. V. Yemel'yanova	194	On the electrical conductivity of thin metal wires

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 2 — CONTENTS — 1981

D. A. Vul' and M. A. Krivoglaz	1	Electron energy and peculiarities of ordered systems with long periods. I. Rearrangement of the electron spectrum on formation of long period lattices and changes of electron energy
V. P. Kalashnikov, N. V. Kozhevnikov and A. B. Zolotovitskiy	14	Spin relaxation electron processes in ferromagnetic metals and semiconductors. IV. Cross relaxation
A. P. Zhernov and T. A. Mamedov	22	Influence of anharmonic interaction on static displacements of ions round an impurity atom
L. M. Sheyko, F. D. Miroshnichenko, L. S. Chervonev and O. N. Ivanchenko	28	Influence of a state of planar strain on the distribution of spontaneous magnetization in a silicon iron crystal
S. A. Shabalovskaya, A. G. Narmonev, A. I. Lotkov and A. I. Zakharov	33	The photoelectron spectrum of intermetallic TiNi and its variations during the martensitic transformation
G. V. Ivanova and L. M. Magat	39	On the problem of the reversible changes in the structural state and coercive force of alloy $Sm(Co_{0.80}Cu_{0.15}Fe_{0.05})_7$
A. G. Shishkov, Yu. N. Fedyunin, Ye. N. Il'icheva, B. M. Abakumov, N. D. Baykova and S. N. Marchenko	42	Microstructure of magnetic holograms on MnBi films
D. N. Bol'shutkin, V. A. Desnenko, V. Ya. Il'yichev and V. A. Pestryakov	50	Low-temperature plastic deformation and susceptibility of steels Kh18N(20–25)
Ya. L. Linetskiy, Yu. A. Skakov and Yu. D. Yagodkin	57	Anomalous diffraction effects on the patterns of $SmCo_5$-based alloys for permanent magnets
Yu. M. Yarmoshenko and E. Z. Kurmayev	62	X-ray emission spectral analysis of the nearest neighbourhood of transition metals in alloys
P. Vasilev, I. N. Goncharov, G. T. Zhdan, Sh. Sh. Ibragimov, V. G. Luppov, N. M. Osipova, L. V. Petrova, V. F. Reutov and Ye. P. Romanov	68	Microstructure and superconductive properties of Nb–Ti alloys after helium injection and heat treatment
B. I. Nikolin and N. N. Shevchenko	74	The formation of new multilayer martensite phases in Co–Al alloys as a manifestation of polytypism
Yu. S. Nechayev and A. A. Zhukovitskiy	83	On the segregation of vacancies and iron atoms near dislocations in aluminium
M. I. Zakharova and A. A. Aminov	88	Structure transformations during decomposition of the β solid solution in alloys of Zr with Mo, Al, Nb, V and Ta
I. Ya. Dekhtyar, R. G. Fedchenko, V. A. Rafalovskiy, G. Dlubek, O. Brummer and W. Gerber	97	Positron annihilation investigation of the polymorphic transformation in cobalt
Yu. M. Plishkin, G. L. Podchinenova and I. Ye. Podchinenov	102	Computer calculation of the energy barriers to the migration of a vacancy along the core of an edge dislocation in the f.c.c. lattice of copper

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN – DUAM)

A. D. Spektor, Yu. D. Kozmanov, G. Ye. Kagan and V. V. Lobanov	106	Diffusion, permeability and solubility of hydrogen in alloys Pd–1 at.% Er, Pd–1 at.% Dy
A. B. Vinokur (dec.) and B. B. Vinokur	109	Optimization of heat treatment programs in relation to the phase and structure state of steel 30KhGVT
D. A. Mirzayev, M. M. Shteynberg, T. N. Ponomareva, B. Ya. Byl'skiy and S. Ye. Karzunov	116	$\gamma \rightarrow \alpha$ Phase transformation in binary alloys of iron with copper, cobalt, ruthenium and platinum
L. N. Paritskaya and V. V. Bogdanov	127	Peculiarities of the formation of an intermetallic constituent in a brittle matrix as a result of mutual diffusion (system Al–Sb)
V. I. Levit and N. D. Bakhteyeva	135	Influence of carbon on the structure and properties of Nimonics subjected to high-temperature thermomechanical treatments
V. I. Dotsenko and V. V. Pustovalov	144	Low-temperature plasticity of directionally crystallized lead–cadmium alloys of eutectic composition
V. G. Chudinov and V. I. Protasov	149	Influence of neutron irradiation on creep by dislocation climb
N. V. Dubovitskaya, L. N. Larikov and Yu. V. Bevza	154	Softening of molybdenum single crystals during rolling
N. I. Timofeyev, F. N. Berseneva and V. I. Gromov	159	Changes in the mechanical properties of palladium and its alloys with silver on exposure to hydrogen
Yu. N. Gornostyrev, B. A. Grinberg and L. I. Yakovenkova	167	Different types of superdislocation dissociation in ordered alloys with $L1_2$ structure
		Short Reports and Letters to the Editor
T. L. Dobrovol'skaya, P. V. Titov and L. G. Khandros	174	Reversible change of shape in alloy copper–aluminium-manganese
V. V. Dyakin, V. Ya. Rayevskiy and Yu. A. Sharin	178	On calculation of the density of states
V. I. Savin, V. Ya. Markin, Ye. Yu. Momin and B. G. Drozdov	182	Influence of plastic deformation on the magnetic properties of polycrystalline beryllium
T. K. Vladimirskaya, L. M. Kaputkina, T. I. Morozova and O. V. Samedov	184	Investigation of the tempering processes of quenched steel 60S2 after high-temperature thermomechanical treatment
G. S. Kandaurova, S. D. Mal'ginova and N. N. Bykhanova	189	Influence of antiferromagnetic planar defects on the hysteresis properties of uniaxial ferromagnets
M. M. Kas'yan	191	On the distribution of impurity atoms round dislocations in block boundaries, determined by the method of internal friction

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 50, No. 3 — CONTENTS — 1981

A. A. KATSNEL'SON, A. M. SILONOV and V. M. SILONOV	1	Application of the regularization method for determining the partial short-range order parameters of a ternary Ni–Re–Mo alloy from the diffuse X-ray scattering
A. A. SMIRNOV	7	Thermal diffusion in interstitial alloys
B. F. KOSTROMIN, YU. M. PLISHKIN and I. YE. PODCHINENOV	12	Microscopic model calculation of the relaxation volume of point defects
I. S. SHPOTIN, G. M. ZHIDOMIROV, O. T. MALYUCHKOV and L I. YASTREBOV	16	Electronic structure of non-stoichiometric hydrides of nickel and palladium
V. I. RYZHKOV	23	Theory of atomic distribution in a binary alloy with a free surface in the self-consistent field approximation
V. S. SEMENOV	33	Analytical representation of an asymmetrical Bloch wall in magnetic films
YU. A. IZYUMOV, F. A. KASSAN-OGLY and V. YE. NAYSH	39	On the interaction of structure and magnetic phase transitions in a $KMnF_3$ crystal
J. PRINHALTER, V. P. SILIN and O. M. TOLKHACHEV	48	Concerning the cyclotron resonance on sliding electrons in the infrared range
B. A. ALEKSASHIN, S. V. VERKHOVSKIY, A. P. STEPANOV and E. V. GALOSHINA	56	Nuclear magnetic resonance in alloys $V_3Si_{1-x}Co_x$
A. A. KAZAKOV and V. A. REYMER	66	Magnetic anisotropy of the rare-earth sublattice of quasibinary compounds of the $R(A_{1-x}B_x)_2$, $R(A_{1-x}B_x)_3$, and $R_2(A_{1-x}B_x)_7$ types
L. B. DUBROVSKAYA, V. M. ZHIKHAREV and L. N. MATYUSHINA	72	Magnetic susceptibility and superconductivity of niobium nitrides
T. Z. PUZANOVA, A. G. POPOV, YA. S. SHUR and V. G. MAYKOV	77	Domain structure and magnetic reversal in Sm–Co–Fe–Cu–Zr magnets
N. P. GRAZHDANKINA, I. F. MIRSAYEV, M. A. NOVIKOV and G. G. TALUTS	81	On the theory of first-order magnetic phase transitions under hydrostatic pressure. I. Phase equilibrium in order–order transitions
V. YE. ADAMYAN, V. V. ALEKSANDRYAN, M. A. MELIKYAN and E. S. ABOVYAN	88	Temperature dependencies of the susceptibility and magnetization of solid solutions of the system $Gd_xPr_{1-x}Zn$
B. S. BOKSHTEYN, L. M. KLINGER, I. M. RAZUMOVSKIY and YE. N. UVAROVA	93	On diffusion in amorphous alloys
V. P. KOVERDA	100	On the microscopic theory of melting of small metal particles
V. M. SCHASTLIVTSEV, V D SADOVSKIY, L. I. BERSHTEYN, A. A. MEL'NIKOVA, A. M. POLYAKOVA, I. L. BARMINA and I. L. YAKOVLEVA	105	A special case of structure inheritance in cast steel 30KhGNM
I. N. POLETIKA, A. M. ZHERDEV and V. YE. PANIN	113	Grain boundary adsorption of *d*-metals in diluted molybdenum-based alloys

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN – DUAM)

M. A. SMIRNOV, V. G. PUSHIN, R. R. ROMANOVA, N. T. KAREVA, L. V. SMIRNOV, D. P. RODIONOV and E. S. ATROSHCHENKO — 121 — Structure and mechanical properties of maraging steel after plastic deformation and shock loading

V. V. MARTYNOV and L. G. KHANDROS — 131 — Superelastic deformation due to a series of martensitic transitions

M. S. BLANTER — 136 — Strain-induced interaction of substitutional and interstitial atoms in VA metals and α iron

R. Z. VALIYEV, O. A. KAYBYSHEV, M. KH. RABINOVICH, YU. P. TIMOSHENKO and O. L. CHISTOVA — 142 — Mechanisms of superplastic deformation of aluminium alloy AMg6

I. I. PAPIROV and A. S. KAPCHERIN — 150 — Microhardness anomalies of rhenium

A. D. SHESTAKOV and A. A. ALEKSEYEV — 155 — The relation between the processes involved in the circumvention and intersection of strengthening particles by a series of dislocations in the process of slip

YU. S. PYATILETOV — 165 — Mechanisms of transient radiation creep

V. N. PEREVEZENTSEV and V. V. RYBIN — 171 — Analysis of defect structures and accommodation mechanisms during superplastic flow of polycrystals

Short Reports and Letters to the Editor

A. V. ONISHCHENKO, YU. I. MALOV and V. I. LAZAREVA — 180 — Work function of binary metallic alloys with sodium

G. S. KRINCHIK and L. V. NIKITIN — 183 — Induced magneto-chemical anisotropy and the influence of a magnetic field on segregation of a ferromagnetic phase in the surface layer of non-magnetic compounds

M. F. KARIMOV and G. S. KANDAUROVA — 185 — Influence of magnetic prehistory on the domain structure of amorphous Gd–Co films of different compositions

A. A. PAVLYUKOV — 188 — X-ray diffraction analysis of structure transformations in alloy $Sm(Co_{0.9}Cu_{0.1})_8$

I. V. ZOLOTAREVSKIY, V. L. SNEZHNOY, I. YA. GEORGIYEVA and L. A. MATYUSHENKO — 191 — Magnetostriction of the austenite of iron–nickel-manganese alloys with dual martensitic transformation kinetics

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 4 — CONTENTS — 1981

S. P. Zelenin, A. S. Kondrat'yev, A. Ye. Kuchma and V. M. Uzdin	1	Electromagnetic waves in thin metallic films in a magnetic field
V. P. Chekmarev and G. I. Mamniashvili	6	Analog of the many-pulse effect in the single-pulse echo method
A. M. Brodskiy and L. I. Daykhin	10	On the theory of electroreflection of metals
E. V. Kozlov and V. B. Kashirin	21	A theory of atomic ordering based on series expansion of the entropy over correlation
Z. A. Gurskiy and S. V. Syrotyuk	28	On the classification of metals in terms of pseudopotential theory
T. A. Matveyeva and R. F. Yegorov	33	Electron band structure of gadolinium
B. N. Aleksandrov	41	Influence of homovalent impurities on the residual resistivity of metals
I. S. Belyatskaya and Ye. A. Sukhareva	50	Magnetic properties and structure of single crystals of alloy Fe–23% Cr–15% Co–5% Mo
A. N. Korshunov, V. M. Fedorov, I. M. Sharshakov and V. T. Grokhotov	57	Influence of rare-earth impurities on the electronic transformation in cerium
M. N. Mikheyev and E. S. Gorkunov	61	On the possible reasons for differences in the magnetic reversal processes of heat-treated engineering steels in weak and medium magnetic fields
V. N. Morgun	68	Resistivity anisotropy and deviation from the Matthiessen standard in single crystals of beryllium with impurity copper
V. I. Izotov, Ye. Ya. Osada, M. S. Astrakhantsev, V. N. Zambrzhitskiy and L. K. Mikhaylova	74	Influence of austenite ageing with precipitation of dispersed VC carbides on the peculiarities of athermal and isothermal martensitic transformation in alloys Fe–Ni–V–C and Fe–Ni–Mn–V–C
V. M. Schastlivtsev, L. N. Romashev, I. L. Yakovleva and V. D. Sadovskiy	84	Electron microscopic investigation of the structure of martensite crystals nucleated during exposure to a pulsating magnetic field
Ye. Z. Vintaykin, V. M. Sakhno (dec.) and V. A. Udovenko	93	Fine crystal structure of MnCuGe alloys
D. S. Gencheva, A. A. Katsnel'son, L. L. Rokhlin, V. M. Silonov and Farid A. Khavadzha	98	Investigation of short-range order in magnesium alloys with erbium and gadolinium
A. A. Katsnel'son, Yu. D. Goncharenko, R. B. Grabova and V. M. Kosenkov	104	Diffuse X-ray scattering in neutron irradiated nickel
I. L. Lebedeva, I. M. Lyubarskiy and G. P. Umanskiy	109	Uphill diffusion of alloying elements in chromium nickel steels during friction *in vacuo*
S. A. Demin, A. I. Ustinov and K. V. Chuistov	116	Influence of nickel and iron on the structure of martensite in manganese-based alloys
N. V. Zvigintsev, S. B. Mikhaylov, V. V. Ovchinnikov and S. S. Orel	123	The role of layering in the stability of the properties of stainless maraging steels used for long periods at high temperatures

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN – DUAM)

M. I. ZAKHAROVA and G. N. DUDCHENKO	131	Structural states of alloys Cu–15·0–19·0 at.% Sn after quenching, and definition of the α' phase structure
A. N. MOISEYEV, L. I. IZYUMOVA, M. P. USIKOV and E. I. ESTRIN	137	Structure features and kinetics of the polymorphic $\gamma \rightarrow \alpha$ transformation in iron–nickel alloys
YE. Z. VINTAYKIN, S. YU. MAKUSHEV, D. F. LITVIN and I. YA. GEORGIYEVA	147	Investigation of the deformation of monocrystalline manganese-based alloys and the shape-memory effect
L. S. APAROVA and A. D. KOROTAYEV	155	Dispersion hardening of single crystals of Cu–Ni–Al–Mn alloys at the stage when the coherent phase Ni_3Al is precipitated
V. K. PORTNOY, I. I. NOVIKOV and V. S. LEVCHENKO	164	Formation of new grains during superplastic deformation of alloy Zn–22% Al
YU. N. GORNOSTYREV, B. A. GRINBERG and L. I. YAKOVENKOVA	170	Free transformations of superdislocations and temperature peculiarities of the plastic behaviour of ordered alloys with $L1_2$ structure
		Short Reports and Letters to the Editor
G. G. AMIGUD, V. V. OVCHINNIKOV and M. A. FILIPPOV	179	Mössbauer investigation of the h.c.p. phase of iron–manganese alloys
V. G. CHUDINOV, N. V. MOSEYEV, B. N. GOSHCHITSKIY and V. I. PROTASOV	182	Peculiarities of radiation damage in V_3Si
L. S. SVANIDZE, V. A. GOLIKOV and YU. D. TYAPKIN	185	On the nature of the surface relief resulting from the eutectoid decomposition of alloys Cu–Be and ageing of alloys Cu–Be, Ni–Be
V. P. LYASHENKO, YA. I. SPEKTOR and V. T. BORISOV	189	Peculiarities of the strengthening and the structure of bearing steel during hydroextrusion and subsequent heat treatment
K. M. KOLOBOVA, I. N. SHABANOVA, O. A. KULYABINA, V. A. TRAPEZNIKOV and V. YE. DOLGIKH	193	Investigation of the electronic structure of spheroidal graphite in aluminium pig irons
T. I. IVANOVA, R. Z. LEVITIN, S. A. NIKITIN, YE. V. TALALAYEVA and L. A. CHERNIKOVA	196	Influence of the field dependence of the magnetic anisotropy constants of gadolinium on the magnetocalorific effect near the Curie point

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 5 CONTENTS 1981

R. I. Barabash and M. A. Krivoglaz	1	Influence of anisotropy on X-ray scattering by highly distorted ageing solid solutions
A. I. Olemskoy	13	The quasiparticle concept in the theory of spatially periodic structures
Ye. V. Chulkov, V. Ye. Panin and S. G. Psakh'ye	22	Atomic interaction and energy of vacancy formation in intermetallic compounds LiAl, LiIn and NaTl
A. Ye. Volkov, V. A. Likhachev and L. S. Shikhobalov	28	Continuous theory of interfaces in heterogeneous crystals
D. I. Sirota and N. P. Kolmakova	36	Parametric sound amplification by a pulsating magnetic field in ferromagnets with cylindrical magnetic domains
T. A. Matveyeva and R. F. Yegorov	40	Electron band structure of terbium and dysprosium
G. G. Amigud, V. V. Ovchinnikov, V. S. Litvinov and M. A. Filippov	45	Distribution of hyperfine fields in iron–manganese alloys
I. V. Kavich and I. D. Shcherba	52	X-ray spectranalysis of the electronic structure of yttrium gallides
S. F. Dubinin, A. P. Vokhmyanin and S. K. Sidorov	56	On the magnetic structure of alloy $Fe(Pt_{0.46}Pd_{0.52}Fe_{0.02})_3$ with random exchange links of different signs
A. V. Andreyev, A. V. Deryagin, S. M. Zadvorkin and V. N. Moskalev	64	Magnetostriction distortions of the crystal structure in $ErFe_2$ and $DyFe_2$
V. F. Novikov and Ye. V. Dolgikh	68	Concerning the influence of elastic stresses on the magnetic properties of compound $Dy_{0.7}Tb_{0.3}Fe_2$
V. R. Baraz and V. V. Pokachalov	71	Kinetic peculiarities of the ageing of deformed austenitic alloy 13Kh18N10G3S2M2
V. M. Schastlivtsev, V. D. Sadovskiy, O. P. Morozov and I. L. Yakovleva	76	On the existence of low-temperature pearlite in hypereutectoid steels
I. M. Sharshakov, V. V. Putilin, L. V. Nikiforova and D. Ye. Soldatenko	86	Phase composition and internal friction of Silmanal
N. A. Rogalina and A. V. Shalimova	92	Distribution of misorientations in a pseudopolycrystalline aggregate
T. V. Shchegoleva	98	On the peculiarities of the formation of a metastable γ' phase in an aluminium–silver alloy
V. A. Gol'tsov and V. A. Kirillov	107	Influence of hydrogen phase hardening on the electrical and mechanical properties of palladium
A. S. Lavrenko, V. Ye. Ol'shanetskiy and B. S. Natapov	111	Softening of cold deformed tungsten during rapid heating
G. V. Vladimirova, A. Orlova and G. A. Malygin	118	Deformation and ageing kinetics of the solid solution Al–0·2 at.% Zn in the temperature range (0·2–0·5) T_m
R. R. Romanova, A. N. Uksusnikov, V. G. Pushin, A. I. Uvarov and N. N. Buynov	129	On the structure and strength–plasticity interrelation of step aged alloys

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN–DUAM)

O. A. Troitskiy and P. U. Kalymbetov	134	Dependence of the electroplastic effect in zinc on individual pulse lengths
V. M. Kardonskiy, V. I. Malkin and I. Ya. Sokol	138	On the mechanism of delayd rupture of maraging steels
V. I. Bashmakov and T. S. Chikova	143	Kinetic study of the formation of wedge-shaped twins in bismuth crystals
		Short Reports and Letters to the Editor
V. V. Shulika, I. Ye. Startseva and Ya. S. Shur	150	Influence of destabilization of the domain structure resulting from rapid cooling, on the magnetic properties of silicon iron
V. S. Khlomov, Yu. E. Ugaste and V. N. Pimenov	154	Investigation of mutual diffusion in the system iron–vanadium
V. D. Blank, M. V. Veller, Yu. S. Konyayev and E. I. Estrin	157	Temperature stability of the ω phase of zirconium
Ye. Z. Vintaykin and V. A. Udovenko	160	Premartensite instability in manganese–copper alloys
A. V. Shalimova and N. A. Rogalina	163	Influence of misorientations of neighbouring grains on boundary sliding
V. T. Dovgiy, Ye. F. Khodosov and V. A. Shapovalov	166	Two types of cylindrical magnetic domain and their mutual transitions
A. G. Lesnik	169	Thermodynamic properties of a "gas" of superparamagnetic clusters in an amorphous ferromagnet with random anisotropy
V. A. Melik-Shakhnazarov, I. A. Naskidashvili and V. I. Serdobintsev	172	Ordering of oxygen in the Cottrell atmospheres of the system niobium–oxygen
Ye. D. Soldatova	174	On the tricritical point of isomorphous transition in cerium metal
A. L. Samsonik and G. A. Sirenko	178	Strengthening effects and substructural changes during the plastic deformation of titanium
N. F. Ogdanskiy and V. G. Otroshchenko	181	Structure of rapidly crystallized manganese–nickel alloys
V. I. Izotov and M. S. Astrakhantsev	183	Influence of the size of particles precipitated from the austenite on the structure of the martensite inheriting them
A. N. Korshunov, I. M. Sharshakov and G. L. Polner	186	On the $\alpha \rightarrow \beta$ transformation mechanism in cerium
B. V. Molotilov, A. I. Zakharov, A. G. Narmonev, Yu. A. Matveyev and A. F. Prokoshin	189	PES study of the transition from the amorphous state to crystalline alloy $Fe_{45}Ni_{45}P_{8.5}B_{1.5}$
Ye. G. Ayzentson, A. B. Volyntsev and L. V. Spivak	192	The phenomenon of the slowing down of the reverse mechanical aftereffect
V. M. Kalinin and V. A. Kornyakov	194	Young's modulus of alloyed iron–nickel Invars
A. M. Gabovich	197	Electrostatic interaction of dislocation walls with charged point defects in metals
A. G. Khundzhua and M. I. Zakharova	200	Premartensite structural states in alloys based on titanium nickelide

THE PHYSICS OF METALS AND METALLOGRAPHY

FIZIKA METALLOV I METALLOVEDENIE

VOLUME 51, No. 6 CONTENTS 1981

N. I. Vlasova, G. S. Kandaurova, Ya. S. Shur and N. N. Bykhanova	1	Magnetic properties and crystal structure of Mn–Al alloys (Review)
L. A. Bol'shov	36	On short-range order in multicomponent alloys
V. S. Semenov	42	Structure and energy of two-dimensional Bloch walls in thin and thick magnetic films
M. I. Zhovtanetskiy, Z. A. Gurskiy, Ya. I. Dutchak and P. N. Yakibchuk	49	Model pseudopotential of transition metals. Total binding energy of 3*d* metals
L. A. Ugodnikova, S. G. Chuchman and L. M. Noskova	56	Some regularities in the variations of magnetic properties in the system scandium–heavy rare-earth metal
L. P. Ivanov, A. S. Logginov, G. A. Nepokoychitskiy and V. V. Randoshkin	65	Dynamical distortions of a cylindrical magnetic domain in a uniform magnetic field
V. V. Nemoshkalenko, V. N. Antonov and Vl. N. Antonov	73	Investigation of ultrasoft X-ray spectra of iridium, platinum and gold
A. G. Lavrent'yev	78	Magnetic noise of specimens of alloy 79NM in square pulse and sinusoidal excitation fields
V. P. Khlyntsev, L. P. Potapov and V. N. Kondrat'yev	85	Study of the crystallization of metallic glass $Ni_{60}Nb_{40}$
N. P. Kulish, V. M. Mandryka and P. V. Petrenko	89	Internal friction study of the mechanism of short-range ordering in low-concentration iron–aluminium alloys
V. P. Koverda, V. N. Skokov and V. P. Skripov	97	Influence of fluctuations and non-equilibrium faceting on the melting of very small metallic crystals
M. I. Gol'dshteyn, L. P. Zhitova and V. V. Popov	104	Influence of titanium carbonitrides on the structure and properties of low-carbon steels
V. I. Zel'dovich, I. G. Komarova and V. D. Sadovskiy	111	Dilatation investigation of the $\alpha \rightarrow \gamma$ transformation and inheritance of the strengthening induced by plastic deformation during polymorphous transformations in iron–nickel-carbon alloys
R. R. Romanova, V. G. Pushin, A. N. Uksusnikov and N. N. Buynov	120	Structure and mechanical properties of austenitic nickel and manganese steels strengthened by vanadium carbide
Ye. Ye. Badiyan and S. A. Bakharev	130	Structural changes which accompany the plastic deformation of lead single crystals
V. Ya. Il'yichev, I. N. Klimenko and S. M. Dergun	135	Temperature anomaly of the yield point of iron–chromium–nickel alloys at low temperatures and the effect of a steady magnetic field
Sh. Kh. Khannanov	142	Work hardening and dispersed fracture dynamics of two-phase alloys

(Continued inside back cover)

ISSN 0031-918X

Printed in Poland (PWN–DUAM)

Short Reports and Letters to the Editor

G. M. KUDINOV and B. YA. LYUBOV	149	Influence of structure defects on the diffusion of interstitial impurities in metals
I. I. YAKIMOV and V. V. LITVINTSEV	153	Peculiarities of the reverse $\alpha \rightarrow \gamma$ transformation in iron–nickel Invar films
L. M. SHEYKO, O. N. IVANCHENKO and L. S. CHERVONEV	157	Determination of the stresses generated by electrical insulation coatings in a sheet of anisotropic transformer steel
V. YU. KAMENEVA	160	On the magnetic state of an impurity atom in a polycrystalline solid solution
S. M. BANOVA, I. A. KORSUNSKAYA, G. M. KUZNETSOV, V. G. LEONT'YEV, YU. S. NECHAYEV and YU. A. PUSTOV	162	Influence of pressure on the solubility of iron ($FeAl_6$,$FeAl_3$) in aluminium
YU. V. KONOBEYEV	166	Energy of helium solution in metals and alloys
A. I. ZAKHAROVA, YU. A. MATVEYEV, A. G. NARMONEV and O. V. BASARGIN	168	Photoelectron spectroscopy of iron–palladium alloys and allowance for electron localization in the Invar effect
L. M. MAGAT, V. I. KHRABROV, T. P. LAPINA, N. N. SHCHEGOLEVA, V. S. GAVIKO and L. V. YELOKHINA	172	Coercive force and decomposition of the supersaturated solid solution of $Sm(Co_{0.65}Cu_{0.35})_{5.6}$
V. A. DOMYSHEV, V. T. ASHCHEPKOV, V. ZH. YELIZAROV and V. G. KAZAKOV	177	Magnetostriction of superstructured Ni_3Mn alloys doped with copper
O. I. PONOMAREVA	179	Temperature coefficients of induction of cobalt alloys with samarium and heavy rare-earth metals

L.
1
81